



# HUNTING THE HIDDEN DIMENSION



International

1 X 60 HD

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You may not know it, but fractals, like the air you breathe, are all around you. Their irregular, repeating shapes are found in cloud formations and tree limbs, in stalks of broccoli and craggy mountain ranges, and even in the rhythm of the human heart. In *Hunting the Hidden Dimension*, NOVA takes viewers on a fascinating quest with a group of maverick mathematicians determined to decipher the rules that govern fractal geometry.

For centuries, fractals were considered beyond the boundaries of mathematical understanding. Now, mathematicians have finally begun mapping this uncharted territory. Their remarkable findings are deepening our understanding of nature, and stimulating a new wave of scientific, medical, and artistic innovation stretching from the ecology of the rainforest to fashion design.

It took a maverick with a hard-won aversion to authority to stand up to the conventional wisdom that nature stood outside the bounds of mathematics—mathematician Benoit Mandelbrot—who coined the word “fractal,” from the Latin word *fractus*, meaning irregular or broken up. Through interviews and personal artifacts, Mandelbrot shares the story of his struggle to survive as a Jewish teenager in Nazi-occupied France, his journey to America, and his lifelong fascination with a corps of European mathematicians whose explorations of the so-called “mathematical monsters” laid the groundwork for his own discoveries.

*Hunting the Hidden Dimension* highlights filmmakers, fashion designers, physicians, and researchers using fractal geometry to innovate and inspire and weaves cutting-edge research from the front lines of science into a compelling mathematical detective story. Told in an engaging, fast-moving, and visually imaginative style, the film introduces a number of distinguished individuals who have used fractal geometry to transform their fields, like Loren Carpenter, who created the first completely computer-generated sequence in a movie.

But fractals are more than pretty pictures. Almost all living things distribute nutrients through their bodies via branching networks, such as systems of blood vessels, which obey the rules of fractal geometry. In Toronto, physicist Peter Burns is making a mathematical model of blood vessels to try to find ways to diagnose cancer earlier than is now possible. In Boston, cardiologist Ary Goldberger has discovered that, contrary to centuries of belief, a healthy human heartbeat does not have an even pattern like a metronome, but rather has a jagged, variable fractal pattern—a discovery that one day may help doctors diagnose cardiac disease before damage is done.

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## NOVA

CREDITS

Senior Executive Producer: Paula S. Apsell

Producers & Directors: Michael Schwarz & Bill Jersey

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